



SOUTH AFRICA



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INNOVATIVE FISHING TECHNIQUE TO PREVENT WHALE ENTANGLEMENT

ROPELESS FISHING: THE SOLUTION TO WHALE ENTANGLEMENT

WHAT CAUSES WHALE ENTANGLEMENT?

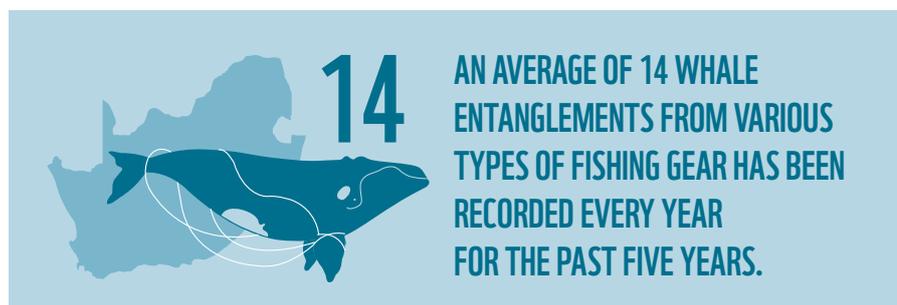
One of the biggest threats to whales and dolphins is accidental capture in fishing gear. Whale entanglements in fishing lines and ropes is a growing challenge on a global scale as the incidents lead to suffering and increasingly, death.

In South Africa the West Coast rock lobster and the South Coast rock lobster fisheries, as well as the experimental and somewhat controversial octopus “pot” fishery, are all sectors of concern. Whales often get entangled in the rope-based fishing gear of these three fisheries. To catch octopus or rock lobster, fishers use baited fishing pots or traps submerged on the ocean floor and attach ropes that are marked with buoys on the surface.

WHAT HAPPENS TO AN ENTANGLED WHALE?

When a whale gets caught in fishing lines or ropes it could drown due to the exhaustion of dragging the lines as it swims or it may get trapped below the surface and not be able to breathe in air. A whale may also develop an infection from the ropes cutting into its skin or it could starve to death due to restricted movement from being entangled in fishing gear.

The South African coastline is frequented by several species of whales, with Bryde’s, humpback and southern right whales being the most common. The nutrient-rich waters make for ideal feeding grounds, and several sheltered bays provide the perfect location for calving and mating.



COSTS OF WHALE ENTANGLEMENT

If the whale dies

Whale death due to entanglement not only results in the loss of a whale and its estimated value to the ecosystem and economy, there is also a hard cost for the local municipality to remove the dead animal. This usually includes the use of heavy earth-moving equipment such as front-end loaders, as well as an approximately 27-tonne flatbed truck to transport the carcass. Based on estimates from daily hiring rates, this amounts to approximately R10 000 per death.

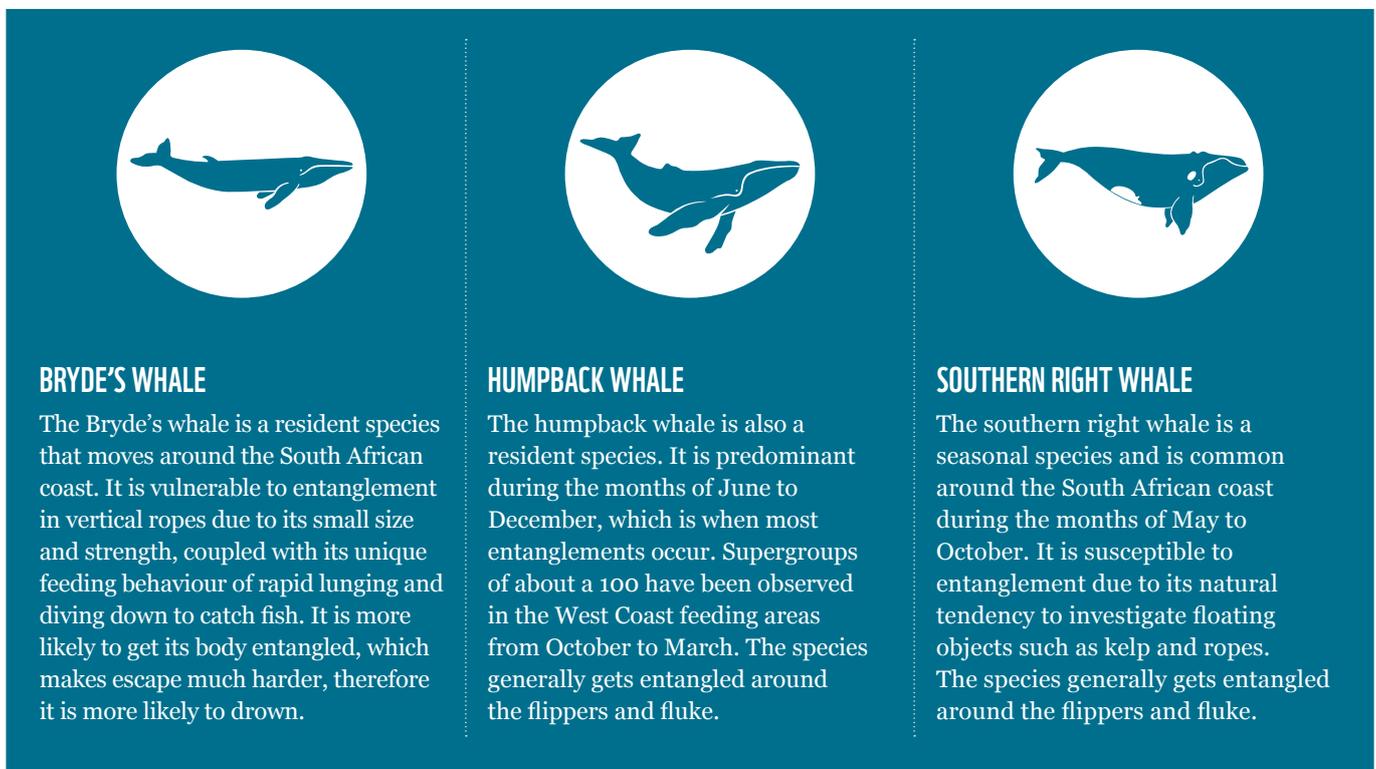
If the whale is rescued

There are also costs for the disentangling of a whale. These are mostly carried by the South African Whale Disentanglement Network (SAWDN). They are a specialised body of volunteers whose purpose is to rescue entangled whales across South Africa’s seas. In response to entanglements, the SAWDN sends out a lightweight boat accompanied by a bigger safety vessel. Both boats use engines that consume approximately 150 litres of fuel during a five-hour disentanglement process. This amounts to R4 500 per entanglement at R15 per litre of fuel. With an average of 14 entanglements per year for the past five years, that equates to about R63 000 annually.

ANNUAL FREQUENCY AND COST OF WHALE ENTANGLEMENT PER FISHERY



COMMON SPECIES OF WHALES IN SOUTH AFRICA



WHY IS ROPELESS FISHING THE SOLUTION?

The ropeless fishing technique provides a win-win opportunity for both the fisheries and sea life. Through this solution-focused method, whale entanglement in octopus and rock lobster fishing gear can be prevented and fishing can fairly safely continue.

The system allows traps or pots on the seabed to be remotely retrieved to the surface (using innovative yet simple technology) and removes the stationary vertical ropes in the water column that often entangle whales. Although ropes are still used when following this technique, they are held inside a storage bag on the seafloor. This is to ensure that the buoy line or ropes and buoy are held on the seabed until it is time to activate the release mechanism for retrieval. At the point of retrieval, the buoy with the rope attached to it is released and comes to the surface of the sea.

There are various types of ropeless fishing devices available, some of which have been tested in South Africa. The experimental octopus fishery operating in False Bay in the Western Cape started using one such device in 2020. Since switching to ropeless fishing there have been no whale entanglements in this fishery. However more fisheries need to come on board and adopt this technique if we want to reduce the frequency of whale entanglements.



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Pictured here: An octopus fishing boat with ropeless fishing gear - solid yellow buoys each with a green mesh storage bag containing yellow coiled-up ropes, plus a remote-activated acoustic release device.

WHAT DEVICES ARE USED IN ROPELESS FISHING?

Ropeless fishing systems include three components: a submerged buoy, a rope storage system, and a release mechanism.



Submerged buoys

These can either be solid buoys that don't compress under pressure at depth, or inflatable bags which inflate when the release is triggered.



Rope storage systems

These include storage systems where the line is either coiled in a mesh bag or cage or stored in a pipe.



Galvanic timed release

Galvanic timed release comprises two adjacent dissimilar metals which corrode through an electrochemical process called galvanic action. The device is designed to release after a specific pre-set time that cannot be adjusted, which is usually anything from one to 30 days.



Electronic timed release

Electronic timed release triggers the gear after a user-specified amount of time has elapsed. The timer is electronic and the device is typically a wire which is burned to melting point by an electric current. Once broken, the wire releases a buoy. The fisher sets the time before deployment but cannot adjust it once the mechanism has been deployed.



Acoustic release

Acoustic release gives the greatest flexibility in timing. A deck-operated unit sends a coded acoustic signal to the submerged acoustic mechanism, which releases the buoy mechanically. Both units are independently powered.

The last three devices above are examples of the different types of releases available that fisheries can use.

WHAT ARE THE COSTS OF ROPELESS FISHING DEVICES?

Ropeless fishing will require new hardware and a change in the way fishing gear is set and retrieved, with a greater reliance on electronic technology than before. These improvements will come at a cost. The price of the preferred system depends largely on the gear used, as well as the fishing area and ocean floor depth. Costs can range from R70 000 to R150 000 to implement per annum.

There are various kinds of ropeless fishing systems available. When considering the massive cost disparity among the release devices, the industry will need to think about the advantages and disadvantages of each system.

The following were tested and found to be the most feasible options in South Africa.

The costs of additional equipment are based on the models that were tested:

Device	Cost per year	What to consider
Rope storage systems		
Mesh bag	R4 137	There is not much difference in price with both storage systems and their functions.
Pipe	R3 946	
Release mechanisms		
Galvanic timed release	R53 804	The galvanic timed release is the simplest and most cost-effective of the release devices, but it cannot offer the release time precision of the electronic devices. The timing is pre-set in the mechanism. Further, corrosion rates are affected by ocean temperature.
Electronic timed release	R284 648	The electronic timed release gives the skipper the choice of selecting the release time. However, the set time cannot be changed once the device is deployed. The device is the most expensive of the three due to the high price of the release links it uses.
Acoustic release	R147 250	Only the acoustic release can offer release on demand. The fisher can choose when to call the underwater gear by triggering the acoustic release.

OTHER BENEFITS OF ROPELESS FISHING

Decreased shipping hazards: The removal of the buoys from the surface reduces the danger of ships, propellers and rudders being entangled, which apart from posing a safety risk, cost the ship owners and the fishers.

Reduced poaching: Another benefit, which applies particularly to the West Coast rock lobster industry in South Africa, is the reduction of poaching of rock lobsters by fishers who raid the traps of others. By keeping the location of gear secret (without surface buoys) fishers will not lose harvests to illegal operators. Illegal fishing, which is rife in South Africa, poses a further environmental threat, by removing species that are not reported and therefore difficult to account for in stock assessment models.



WHOSE RESPONSIBILITY IS IT?

Involving stakeholders in decision-making processes is a crucial step towards preventing whale entanglement in South Africa. Fishers, scientists and government all have a role to play in sustaining the fishery in a way that causes the least harm to sea life.

In 2019 the Department of Forestry, Fisheries and the Environment's Minister placed a temporary ban on the experimental octopus fishery in False Bay in Cape Town. This followed concerns over entanglements and the death of whales from octopus fishing gear. The suspension was later lifted given that the fishery implemented mitigation measures to reduce the risks of entanglements.

A recent WWF-funded study conducted by the University of Cape Town's researcher Michael Daniel together with Associate Professor Colin Attwood put the various ropeless fishing techniques to test. The results proved that ropeless fishing is possible in South Africa.



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